IMPLICATIONS FOR SEEDING DECISIONS IN 1987

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Introduction

Canadian farmers face economic and financial challenges that are perhaps as great as any time in the past. Eroding land values, volatile prices and rapidly emerging technologies, make it crucial that farmers carefully evaluate what crops they should grow in 1987. Some producers proclaim that they are "going to crop everything this year, wall to wall." Other producers, however, indicate that they intend to cut back on stubble cropping this year and increase summerfallow. The purpose of our discussion is to take a closer look at two fundamental decisions each Saskatchewan farmer will make this spring: "How much acreage should I crop?" and "What crops should I plant." Important variables influencing these questions include relative costs, relative prices, crop yields and government farm policy. The following sections discuss potential 1987 crop prices, crop costs and finally puts both of them together to estimate break-even yields and prices.

Estimating 1987 Crop Prices

Estimating 1987/88 crop prices presents major problems because: 1) it is particularly difficult to establish the initial price this year, and, 2) not all producers face the same planning price. We think that initial 1987 wheat prices may be lower, so we estimate that the initial price for No. 1 CWRS wheat is going to be $2.90 a bushel (basis Saskatoon, down from about $3.15/bushel in 1986/87). There are a number of reasons for

this: including a large world wheat carryover and the aggressive trade policies of various nations, particularly the U.S. and the E.E.C. This year, Canadian wheat carryover is not extremely large, although it has increased from the level in 1985/86.

If lentil contracts are being offered at 16 cents a pound, does that mean that this price can be compared to a wheat price of $2.90/bushel? In some cases the answer is yes. However, in other cases the answer is no. The reason the answer is sometimes no is because of government programs such as Western Grain Stabilization and the Special Canadian Grains Program.

Western Grain Stabilization. Farmers participating in Western Grain Stabilization have their levies deducted from the sale of each bushel of eligible grain. The maximum levy is based on $60,000 of gross receipts and the current levy rate is 1 percent or $600. Assuming a typical farm size of a thousand cultivated acres, about 600 acres cropped and an average of 30 bushels of wheat per acre, 18,000 bushels of wheat are produced. At our assumed price of $2.90 a bushel, the gross receipts are $52,200. We also assume that this producer contributed the maximum levy during periods when grain prices were above current prices. During the coming year, however, most analysts are predicting there will be large payouts under The Western Grain Stabilization Program. If we review recent payments in terms of payouts relative to levies, (Table 1) we find that for each dollar contributed during the 1983/1984 crop year, there were payouts amounting to 1.09 times the levy in 1983/84, 2.70 times

the levy in 1984/85 and 5.12 times the levy in 1985/86. A producer's payment is determined by levy contributions over the past three year period. In total, a producer received almost 9 times his 1983/84 levy as a payment. In addition, it is further projected that the payout relative to levies this year will be high because levies have declined and large payouts are expected for the 1986/87 year. The stabilization payment for an individual who paid the maximum levy may be in excess of $16,000 in 1986/87. The levies will have been smaller so one might expect at least a 7 or 8 to 1 payment during 1986/87 based on their 1986/87 levies. Our current "guesstimate" is that WGSA may pay out between 6 and 14 to 1 over the next 3 years based on the 1987/88 levy, so an average factor of 9 might be used. This individual then might consider adding $.029 (1% of the price) times a factor of 9 or about 30 cents a bushel to his expected price; thus, if his expected price is $2.90/bushel then his total expected price is $2.90/bushel plus 30 cents or 3.20/bushel. Thus, eligible Western Grain Stabilization Program crops should have their prices adjusted upwards. Therefore, ineligible crops such as lentils, peas and canary seed are placed at a comparative disadvantage.

However, if our example farmer's gross receipts decline because of reduced yields, a changed mix of crops, or increased summerfallow, then his W.G.S.A. payment declines. For example, if he contributes $100 less in stabilization levy in 1987/88 due to reduced crop income, it may cost him $900 or more during the

next 3 years. Of course, prices for eligible W.G.S.A. grains are not adjusted for individuals who are not in the Western Grain Stabilization Program or to those individuals who are grossing approximately $150,000 a year from crop sales of which 3/4 has typically been wheat, oats, barley and canola--the major grains.

Table 1. Western Stabilization Payouts

Year	Levy	Levy Maximum	Dollar Payout	Dollar Payout Ratio
1984-1985	1.50%	$900	$9,527	2.70
1985-1986	1.00%	$600	$16,533	5.12
1986-1987	1.00%	$600	$16,000	??
1987-1988	1.00%	$600	??	??

Special Canadian Grains Program. The other major factor affecting crop income/price is the Special Canadian Grains Program. Last year an acreage payment was made based on seeded acres and the kind of crop produced. For our example farm who averages 30 bushels of wheat per acre, the payment amounted to approximately $15 per acre or about 50 cents per bushel. This program favors stubble cropping since no yield difference was considered on each cropped acre although an area which produced wheat on summerfallow may have a higher area yield rating than one which produced wheat on stubble.

So far in 1987, prices have declined further and the need for further cash infusions for the coming year is probably

greater. One might anticipate a payment equal to or larger than the past $1 billion commitment. Of course, the payment to Saskatchewan farmers is highly speculative and should be discounted because of the political uncertainty of the payment, the size of the payment and the mechanism. However, we assume that future government programs will follow recent history. Thus, the combined effect of the WGSA payments and the Special Canadian grains program would tend to dramatically increase the planning price; one might use a planning price for wheat of $3.40 a bushel (or about 50 cents above the level at which initial payments are announced), which includes all government payments.

Now what about other crops like lentils and peas? One can suggest that the producer use current contracted prices as a base price and that first-time producers should incorporate a "yield learning curve" which means planning yields should be reduced and gradually incremented as management experience increases. Volumes produced beyond the contracted volume may be at lower prices. Unless specific announcements are made regarding potential payout rules in a deficiency payment in the 1987/88 crop year--it may be best to assume that special crops will not receive a deficiency payment.

Insurable Price Levels. Another price factor is the insurable price levels offered by the Canada Saskatchewan Crop Insurance Program. For example, last year, 1986/87, wheat was insured at approximately $4.08 per bushel, well above the initial price which was announced in the spring. This resulted in a very

large incentive to insure because of the relatively high level of protection. The higher level of protection was particularly relevant if the farm was located in a hail zone as the hail coverage would be paid out on the basis of the insured value.

Costs of Producing Wheat in Saskatchewan

High fixed costs of producing cereals are a major feature in producing grains in the Western Prairie Provinces: machine and building ownership charges, land costs and management charges account for approximately 60 to 80 percent of the total costs, possibly the highest proportion of any Canadian farm type (1986 Top Management Workshops)[1]. However, in the short-run where capital related costs and management costs are fixed, the only relevant costs are variable costs which include fertilizer, chemicals, fuel, oil, repairs, an opportunity charge for labor and an operating capital charge. The following analysis is based on costs presented in Table 2 which are taken from the 1986 Top Management Workshops. Note that production costs are similar for wheat on the brown and dark brown soils, but that production costs on the black soils are considerably higher due to higher fertilization rates and more intense chemical use.

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[1]For definitions of the various cost procedures and definitions refer to "1986 Costs of Producing Crops and Forward Planning Manual for Saskatchewan," Bulletin FLB 86-1, Department of Agriculture Economics, University of Saskatchewan and FARMLAB. (1986)

Table 2: Total Variable Costs: Short-Run Analysis, 1986

Enterprise	Soil Zone		
	Brown	Dark-Brown	Black
Wheat on fallow	46.56	44.03	61.01
Wheat on stubble	59.20	54.39	74.43
Fallow	9.87	8.65	9.69

Source: R.A. Schoney, 1986. 1986 Costs of Producing Crops and Forward Planning Manual for Saskatchewan Department of Agricultural Economics, University of Saskatchewan.

"How Much Acreage Should I Crop?"

Where yields and prices are highly variable or uncertain, a convenient management tool is break-even analysis[2]. In the following analysis, it is assumed that: 1) the decision maker is maximizing short-run profits, 2) the most uncertain variable is yields, 3) the two relevant alternatives are wheat-fallow and wheat-wheat-fallow rotations and 4) prices and costs remain the same over the next few years. The general break even procedure is to determine the most uncertain variable and then solve for the value of that variable which makes the profits or, in this case, returns above variable costs the same between the two alternatives. While the producer can use the break-even prices

[2]A break-even analysis is based on solving for the value of an uncertain variable which causes the objective function of one alterative to exactly equal that of a second alternative. In farm management, the objective function is often profit, cash flows, or costs.

and yields to judge the probability of being above or below the break-even point, it is not the best way to treat risk and uncertainty. Risk and uncertainty should incorporate the impact of variability in yields on farm cash flows. Break-even wheat stubble yields and wheat prices are presented in Tables 3 and 4 for the dark brown soils.

Break-Even Wheat Stubble Yields. On the dark brown soils and using a farmgate wheat price of $3.00/bushel including all government payments, a stubble wheat yield of 23.4 bushels per acre is required to break even with a fallow wheat yield of 28 bushels per acre (Table 4).[3] Thus, if the farmer's expected stubble yields are greater than 23.4 bushels, then he would seed wheat stubble; if the farmer's expected stubble yields are less than 23.4 bushels, then he would fallow.

Break-Even Wheat Prices to Stubble. For many farmers, the most uncertain variable at seeding time is the combined wheat price. Using Table 4, if the wheat yield on fallow is 30 bushels per acre and the wheat yield on stubble is 25 bushels, then the

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[3]The break-even yield is

$$Y_2 = (Y_1/2) + [(2\ TC_2 - TC_1 - TC_3)/2P\ ]$$

where: Y_n = yield of or stubble wheat,
TC_n = total variable costs,
P = price of wheat,
1 = wheat on fallow,
2 = wheat on stubble and
3 = fallow.

Table 3: Fallow/Stubble: Break-Even Spring Wheat Yields 1986[a]

Stubble Wheat Price	Fallow Wheat Yield (bu/acre)				
	24	26	28	30	32
($/bu.)	(bu/ac)				
2.25	24.5	25.5	26.5	27.5	28.5
2.50	23.2	24.2	25.2	26.2	27.2
2.75	22.2	23.2	24.2	25.2	26.2
3.00	21.4	22.4	23.4	24.4	25.4
3.25	20.6	21.6	22.6	23.6	24.6
3.50	20.0	21.0	22.0	23.0	24.0
3.75	19.5	20.5	21.5	22.5	23.5

[a] Source 1986 Top Management Workshops.

Table 4: Fallow/Stubble: Break-Even Spring Wheat Prices 1986[a]

Stubble Wheat Yield	Fallow Wheat Yield (bu/acre)				
	24	26	28	30	32
(bu/ac)	No. 1 CWRS - price per bushel				
19	4.01	4.68	5.61	7.01	9.35
21	3.12	3.51	4.01	4.68	5.61
23	2.55	2.81	3.12	3.51	4.01
25	NA	2.34	2.55	2.81	3.12
27	NA	NA	2.16	2.34	2.55

[a] Source 1986 Top Management Workshops

break-even wheat price is $2.81 per bushel.[4] Thus, if the farmer's expected wheat price is greater than $2.81 per bushel, then he would seed wheat stubble; if the farmer's expected wheat price is less than $2.81 per bushel, then he would fallow.

"What Crops Should I Plant?"

In addition to the fallow versus stubble decision, many farmers may want to consider which crop to grow. The break-even approach is also convenient in evaluating the best crop to grow. The equation for break-even prices is found by solving for price of alternative a ($price_a$). Given yields, total variable costs (TVC_a, TVC_b) and the price of crop b ($price_b$) are fixed. The equation is:

$$price_a = (TR_b - TVC_b + TVC_a) / yield_a$$

In the following example, variable costs are based on the 1986 Top Management Workshops for the crops grown on fallow on the black soils. Three crops are analyzed: wheat, canola and lentils. Note that the variable costs of growing lentils have been adjusted for a lower 1987 seed cost.

Wheat versus Canola. The same break-even procedure is employed in evaluating wheat versus canola on fallow. Here, it

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[4]The break-even price of wheat is

$$P = [((2\ TC_2) - TC_1 - TC_3)] / [2\ Y_2 - Y_1]$$

where all variables are the same as in the preceding footnote.

Wheat price is in $ per bushel for No. 1 CWRS at Saskatoon.

is assumed that the most risky variable is the price of canola. If the price of wheat is $3.00 / bushel and the respective yields for wheat and canola are 35 and 28 bushels/acre, then the break-even canola price is $4.29 / bushel. Thus, if the farmer expected canola prices to be greater than $4.29 per bushel, then he would seed canola; if the farmer expected canola prices to be less than $4.29 per bushel, then he would seed wheat.

Table 5: Break-Even Canola Prices, Fallow Crops, Black Soil Zone (in $/bushel)

Canola Yield (bu/ac)	Wheat Yield (bu/ac)			
	30	35	40	45
	Wheat Price = $3.00/bu			
24				
28		$4.29	$4.83	$5.36
32		$3.76	$4.22	$4.69
36		$3.34	$3.76	$4.17
	Wheat Price = $3.50/bu			
24				
28		$4.92	$5.54	$6.17
32		$4.30	$4.85	$5.40
36		$3.82	$4.31	$4.80

Based on the following variable costs:
Canola on Fallow = $76.19
Wheat on Fallow = $61.01

Wheat versus Lentils. The same break-even procedure is employed in evaluating lentils versus wheat on fallow. Again, it is assumed that the most risky variable is the price of lentils. If the price of wheat is $3.00 / bushel and the respective yields for wheat and lentils are 35 bushels and 1080 pounds per acre, then the break-even lentil price is $0.161 / pound. Thus, if the farmer expected the price of lentils to be greater than $0.161 / pound, then he would seed lentils; if the farmer expected the lentils price to be less than $0.161 / pound, then he would seed wheat.

Table 6: Break-Even Lentil Prices, Fallow Crops, Black Soil Zone (in $ per pound)

Lentil Yield (lb/ac)	Wheat Yield (bu/ac) 35	40	45
	Wheat Price = $3.00/bu		
1080	$0.161	$0.175	$0.188
1320	$0.131	$0.143	$0.154
1560	$0.111	$0.121	$0.130
	Wheat Price = $3.50/bu		
1080	$0.175	$0.191	$0.207
1320	$0.143	$0.156	$0.169
1560	$0.121	$0.132	$0.143

Based on the following variable costs:
Lentils on Fallow = $131.72
Wheat on Fallow = $ 61.01

Key Management Factors

Finally, producers should carefully consider three key management factors: 1) monitoring and controlling farm business performance, 2) planning for the future and 3) maintaining flexibility and the ability to adjust.

Monitoring and Controlling farm business performance includes controlling costs and monitoring farm cash flows. While cost efficiency is important, we believe that the best loss minimization strategy is still to maximize after-tax profits or in the case of most decisions, maximize returns above variable cost. Likewise, when capital is limited, the producer should allocate his capital so that each dollar generates the same return. This means that when producers reduce inputs, they have to be careful not to over-react. For example, if the net price of wheat is $3.00/bu and the price of nitrogen is $.20/lb, then each pound of nitrogen has to return only slightly more than .20/3.00 or .067 bushels plus the return on capital to be profitable.

We feel that it is particularly crucial that farmers keep track of their own costs and returns. From our experience with the Top Management Workshops, we find that decisions must be based on individual farmer data, not on the familiar rules of thumb. This is particularly true in crop selection.

Planning for the Future includes careful evaluation of all major decisions, particularly those which involve capital expenditures. Given the razor-thin operating margins, we believe

that for the next few years business mistakes should as much as possible, be made "on paper." Moreover, we feel farmers need to look even further down the road than usual in evaluating farm decisions, particularly major shifts in farm production. For example, shifting from a 3 year rotation to a 2 year rotation, means that in the first year of transition, the farm will experience a severe reduction in net cash returns due to a high proportion of crop on stubble to crop on fallow and the corresponding reduction in cropped acres. Finally, crop decisions need to involve careful long-run evaluation of WGSA and government deficiency programs.

Maintaining Flexibility and the Ability to Adjust. We live in volatile times and what worked well last year, may not work well this year because of rapidly changing price relationships. Thus, while lentils may have been a profitable crop last year, it may not be profitable this year. There are cash flow advantages to growing specialty crops: sales result in earlier cash receipts and the sales are unrestricted by the Wheat Board quota system. However, specialty crops are treated as summerfallow in calculating bonus acre provisions in the quota system, reducing the potential advantage of specialty crops, especially in the northern areas. Another disadvantage is that the special Canadian grains program did not include payment on lentils, peas, mustard and other specialty crops.

In addition, changes in beginning soil moisture and the corresponding revision in expected yields may justify last minute

changes in seeding decisions because in a high moisture year, it is more advantageous to stubble crop. This year, much of the southern part of the province has very good soil moisture while some of the north and eastern regions are somewhat deficient in soil moisture. However, beginning soil moisture and the corresponding yield estimates should be determined on an individual basis.

Conclusion

The questions of "How much acreage should I crop?" and "What crops should I plant" will require that each farmer carefully consider not only his own costs and yields but also the impact of the W.G.S.A. and Specialty Grain Crop Programs on price. As much as possible each farmer should pencil his own costs and returns.

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